REMARKS

Upon entry of the Amendment, Claims 1-4, 6-10, 12-20 and 22 will be pending in the application.

Claims 1, 8, 20 and 22 are amended to incorporate the subject matter of the canceled claims by reciting "wherein the roughened surface of the copper coating has an arithmetic mean roughness Ra of 0.1 to 10 μm". No new matter is added.

Claim 6 is amended to delete the duplicate language in the claim. Withdrawal of the objection to the claim is respectfully requested.

Claims 7 and 13-19 are withdrawn from consideration by the Examiner. However, Applicants amend Claims 14 and 17 by reciting "in such a manner that the roughened surface of the copper coating has an arithmetic mean roughness Ra of 0.1 to 10 μm", and kindly request rejoinder of Claims 14-19 once product Claims 1 and/or 8 are allowed, as these method claims now contain all the limitations of the product Claim 1 and 8, respectively.

Furthermore, the Abstract is amended to remove legal terms. Accordingly, Applicants request withdrawal of the objection to the Abstract.

Entry of the Amendment is respectfully requested along with reconsideration and review of the claims on the merits.

Claims 1-4 and 8-10 are rejected under 35 U.S.C. §102(e) as assertedly being anticipated by Hasebe et al. (U.S. Pat. No. 6,744,135).

Claim 5 is rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Hasebe et al. in view of Toshiaki et al. (JP 406152087 A) and Urasaki et al. (U.S. Pat. No. 5,689,879).

Claim 11 is rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Hasebe et at. and further in view of Toshiaki et al. and Urasaki et al.

Claims 6, 12 and 22 are rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Hasebe et al. in view of Masatoshi et al. (JP401119620A) and Galasco et al. (U.S. Pat. No. 6,518,509).

Claim 20 is rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Hasebe et al. in view of Masatoshi et al., Galasco et al. and Siuzdak (U.S. Pat. No. 5,040,292).

Claim 21 is rejected under 35 U.S.C. §103(a) as assertedly being unpatentable over Hasebe et al. (modified with the teachings of Siuzdak, Masatoshi et al. and Galasco et al.) in view of Toshiaki et al. and Urasake et al.

Applicants respond as follows.

Claims 5, 11, 21 and 23 are canceled, thereby making the rejection of these claims moot.

In the present invention, the wiring board is characterized in that the copper coating has a specific degree of surface roughness so as to improve the adhesion of the insulating resin layer to the metal substrate. The roughening of the copper coating is a critical step which provides many benefits. For example, the roughened surface of the copper coating serves as an anchor for anchoring thereon the first and second insulating resin layers formed adjacent to the copper coating so as to improve adhesion of the insulating resin layers to the metal substrate. This makes it possible to prevent the insulating resin layers from becoming separated from the metal substrate and to secure proper electrical insulation. The roughened surface of the copper coating also serves as an anchor for anchoring thereon the blind-via so as to improve the adhesion of the

blind-via to the metal substrate and to prevent the blind-via from becoming separated from the metal substrate for proper electrical conduction. Similarly, the roughened surface of the copper coating produces an anchoring effect on the resin filler so as to improve the adhesion of the resin filler to the metal substrate (see paragraph [0025] bridging pages 7-8 of the specification).

Although, Hasebe et al. may teach a multilayer wiring board that includes a metal substrate, a copper coating applied to the metal substrate and having a roughened surface and an insulating resin layer formed on the roughened surface of the copper coating, but Hasebe does not specifically mention the roughening process of the copper coating and fails to disclose or teach at least Applicants' claimed arithmetic mean roughness range for the surface of the copper coating. Thus, Hasebe fails to anticipate the present claims.

The secondary references fail to make up for Hasebe's deficiencies and are not properly combinable with Hasebe.

Toshiaki et al. teaches a wiring board in which a metal substrate and a rolled copper foil are bonded together by an insulating adhesive layer. Further, the copper foil is subjected to surface roughening before being adhered to the metal substrate in Toshiaki et al. The wiring board of Toshiaki et al. is therefore structurally different from the wiring boards of the present invention and of Hasebe at al., even though Toshiaki el al. recites that the copper foil has a surface roughness Ra of 1.0 to 1.6 μm.

Urasaki et at. teaches a metal foil for use in a printed wiring board, having a three-layer structure of first and second copper layers and a nickel-phosphorus alloy layer between the copper layers. Urasaki et al. recites that the first copper layer has a surface roughness of 2 to

4 μm. However, in Urasaki et al., the first copper layer is processed by forming an etching resist on the first copper layer and etching unnecessary copper so as to define a wiring pattern after the second copper layer and the nickel-phosphorus alloy layer are removed by etching. Thus, the printed wiring board of Urasaki et al. is also structurally different from the wiring board of the present invention.

Hasebe's copper plating 102 is formed on its metal plate 101 (see Fig. 1(a)) followed by a layer of resin (col. 7, lines 31-32). However, Toshiaki discloses a very different wiring board from that of the present invention, where copper foil 3 having a roughened surface is adhered to the metal base 1 via insulating layer/adhesive 2 (see Figure). Likewise, also Urasaki also discloses a very different wiring board, where a metal foil for printed wiring boards comprises a first copper layer to be adhered to a resin, a second copper layer having a sufficient strength as a metal layer and a nickel-phosphorus alloy layer formed between the first and second copper layers (see Abstract and Figure).

One of ordinary skill in the art would not be motivated to apply the surface roughness range of a copper *foil* of Toshiaki to a copper *coating* of the present invention. This is because not only is a copper foil different from plating a copper coating, but also, the structural position of Toshiaki's copper foil not touching the metal base is much different from "a copper coating applied to at least one of the first and second main surfaces of the metal substrate and having a roughened substrate" of the present invention.

Similarly, one of ordinary skill in the art would not be motivated to apply only the first copper layer having a certain surface roughness (about 2 to 4 μm) of Urasaki because Urasaki

specifically teaches a two-copper layer metal foil having differing surface roughness ranges used for producing printed wiring boards (see col. 5, lines 5-40). On the other hand, Applicants' present invention provides for a one-layer copper coating over the metal substrate (and coating the through holes).

In view of such differences in wiring board structures, a person skilled in the art would not have been motivated to combine Hasebe et at with Toshiaki et al. and/or Urasaki et al. and would not have been led to the presently claimed invention or the unexpected advantages associated therewith from the combination of Hasebe et at. with Toshiaki et al. and/or Urasaki et al.

Regarding the additional secondary references, each of Masatoshi et a1. and Galasco et al. merely teaches a method for producing a metal core material in which the metal core material is rolled into a plate, and Siuzdak merely teaches a core material of three-layer structure in which a copper layer has a thickness of 0.06 to 1 mil.

Applicants submit that Claims 1-4, 6-10, 12-20 and 22 are patentable over the references cited and any combinations thereof. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §102(e) and §103(a).

Further, method Claims 14 and 17 are amended to incorporate all the limitations of product Claims 1 and 8, respectively. And Claim 13 already incorporates all the limitations of Claim 8, based on its dependency. Accordingly, Applicants respectfully request rejoinder of Claim 13, and Claims 14 and 17 and their dependent Claims 15-16 and 18-19.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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